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ABSTRACT

To determine the quantity and quality of vitamin A and iron rich foods purchased and prepared by Panamanian homemakers, interviews were held with 31 women who were present in a health clinic adjacent to a food market in Panama City. The interview schedule sought information concerning not only the type and amount of food purchased and the method used to prepare it but also the residential background of the homemakers, the levels of education of both husband and wife, composition of the families, and the ages of the participants. Results indicated that the homemakers who purchased vitamin A and iron rich foods were those who: (1) had a rural background, (2) had a higher level of education, (3) belonged to families where the husband was present and had children under six years of age, and (4) were over 30 years of age. When the data were analyzed, there was slight evidence of vitamin A and iron loss through preparation techniques. On the basis of the results, overall objectives and suggested learning experiences were developed to be included in the School of Home Economics at the University of Panama. (Author/SB)

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VITAMIN A AND IRON RICH FOODS USED BY PANAMANIAN HOMEMAKERS WITH IMPLICATIONS FOR NUTRITION EDUCATION

By

MARIA DE LOURDES RUBIO DE TARTE

Bachelor of Science

Iowa State University

Ames, Iowa

1963

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
MASTER OF SCIENCE
May, 1973

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Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: VITAMIN A AND IRON RICH FOODS USED BY PANAMANIAN HOMEMAKERS WITH IMPLICATIONS FOR NUTRITION EDUCATION

Pages in Study: 85 Candidate for Degree of Master of Science

Major Field: Home Economics Education

Scope and Method of Study: The study was concerned with quantity and quality of vitamin A and iron rich foods purchased and prepared by Panamanian homemakers. The group studied consisted of 31 women who were present at the "Centro de Salud del Mercado" (a health clinic adjacent to a food market) in Panama City. The interview schedule used to gather the data sought information concerning not only the type and amount of food purchased and the method used to prepare it but also the residential background of the homemakers, the levels of education of both husband and wife, the composition of the families and the ages of the participants.

Findings and Conclusions: It was found that the larger number of homemakers who purchased vitamin A and iron rich foods were those who (1) had a rural background, (2) had a higher level of education, either the homemaker or the husband had attended school for over six years, (3) belonged to families where the husband was present and had children under six years of age, and (4) were over 30 years of age. When the data were analyzed there was slight evidence of vitamin A and iron loss through preparation techniques. Over all objectives and suggested learning experiences were developed to be included in a nutrition course in the School of Home Economics at the University of Panama.

ADVISER'S APPROVAL _____

VITAMIN A AND IRON RICH FOODS USED BY PANAMANIAN HOMEMAKERS WITH IMPLICATIONS FOR NUTRITION EDUCATION

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TABLE OF CONTENTS

Chapter		Page
I.	INTRODUCTION	1
	Statement of the Problem	2
	Objectives of the Study	2
	Procedure	3
	Limitations	5
	Definition of Terms	5
	Summary	7
II.	REVIEW OF LITERATURE	9
	Introduction	9
	World Nutrition	9
	The Interdepartmental Committee on Nutrition for National Defense	10
	The World Health Organization of the United Nations	11
	The Institute of Nutrition of Central America and Panama	12
	The Panamanian Situation	13
	Factors Influencing Food Selection	15
	Physical Environment	16
	Cultural Heritage	17
	Interaction of the Factors	18
	Nutrition Education	20
	Home Economics in Panama	25
	Summary	26
III.	METHODS OF PROCEDURE	27
	Selection of Sample	27
	Development of the Instrument	29
	Pre-testing the Instrument	34
	Summary	36
IV.	ANALYSIS AND INTERPRETATION OF DATA	37
	Buying Habits of Good Food Sources of Vitamin A and Iron	37
	Comparison of Foods Purchased by Two Homemakers	40

Chapter

Page

Analysis of Food Buying Habits According to Selected Variables 43
Residential Background of the Homemaker 44
Level of Education of the Homemakers and the Husbands 48
Composition of the Family 51
Age of the Respondent 55
Food Preparation Techniques 57
Person Responsible for Preparing Food 57
Techniques of Preparing Foods 58
Attitudes Toward Diets and Food Preferences 60
Summary 62

V. IMPLICATIONS FOR NUTRITION EDUCATION 64

Description of the Students 64
Objectives and Learning Experiences 64
Summary 69

VI. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 70

Summary and Conclusions 70
Recommendations 73

SELECTED BIBLIOGRAPHY 75

APPENDIX A 80

APPENDIX B 84

LIST OF TABLES

Table		Page
I.	Enrichment of the Product by the Flour Mills	33
II.	Food Sources of Vitamin A and Iron Reported as Purchased by 31 Panamanian Homemakers	39
III.	Daily Proportion of Selected Foods Calculated for Each of the 197 Family Members Represented by the 31 Homemakers	41
IV.	Foods, Vitamin A and Iron Content of a Selected "Good" Diet	42
V.	Foods, Vitamin A and Iron Content of a Selected "Poor" Diet	43
VI.	Years of Residence in Panama City of Homemakers with a Rural Background	44
VII.	Foods Purchased by 15 Percent or More of the Homemakers as Compared to Their Residential Background	45
VIII.	Foods Purchased by 15 Percent or More of the Homemakers with a Rural Background as Compared to Their Period of Residence in Panama City	47
IX.	Years of Formal Education Completed by Homemakers and Their Husbands	49
X.	Influence of the Homemakers' and Husbands' Level of Education on the Food Purchasing Habits	50
XI.	Age Categories of Children Represented by the Homemakers in the Study	52
XII.	Foods Purchased by 15 Percent or More of the Homemakers as Compared to the Presence of the Husband in the Home	53

Table		Page
XIII.	Foods Purchased by 15 Percent or More of the Homemakers as Compared to the Age of the Children	54
XIV.	Foods Purchased by 15 Percent or More of the Homemakers as Compared to the Age of the Homemakers	56
XV.	Persons Responsible for Food Preparation	57
XVI.	Preferred Ways of Serving Vegetables	58
XVII.	Techniques Used in Boiling Vegetables	59
XVIII.	Additional Foods Homemakers Would Purchase with Increased Income	61

CHAPTER I

INTRODUCTION

One of the most important components of health is nutrition, which influences not only the physical development of the individual but also his behavior, his capacity to work, his resistance to diseases, and his mental development. It is an accepted fact that deficiencies of specific nutrients in human beings are manifested by a variety of symptoms and lead, in extreme cases, to nutritional diseases. These symptoms of nutritional deficiencies are found all over the world, but they are more prevalent among the people of developing nations.

Individuals, regardless of nationality, need a minimum amount of essential nutrients for their bodies to grow, develop, and function at their maximum capacity. Unfortunately, nutritional knowledge is not inherited--"to attain good nutrition the individual must be 'taught' to make good food selection . . ." (Eppright, 1971). Nutrition education implies more than teaching the role of specific nutrients in the body. It implies guiding the behavior of persons so that they will choose the foods which will lead to a balanced diet. Thus, "The individual is indeed the focal point of nutrition education" (Eppright, 1971). To consider the individual as the central theme in nutrition education points to the importance of considering all the factors which influence the individual's acceptance or rejection of foods.

Food habits are the result of many physical and cultural factors. A "starting point toward raising levels of nutrition must be a knowledge of what people eat, how far existing diets are satisfactory, and what the basic causes of inadequacy are" (Norris, 1949). Nutritional knowledge and the results of dietary surveys can be used to plan and structure nutritional programs aiming at the improvement of food habits.

The special concern of the author is the nutritional status of the people in Panama. As a college teacher of home economics in the area of food and nutrition, her main objectives will be to help her students become aware of the nutritional conditions of Panamanian people and find ways of improving food habits within the existing cultural pattern.

Statement of the Problem

The problem of this study was to gather information about food buying habits and preparation techniques in relation to good food sources of vitamin A and iron among a sample of the population of Panama City and to use the results of this research to draw implications for a nutrition course at the college level. The food buying habits should indicate the food that is being consumed and thus be indicative of the foods the people have already accepted in their daily diet.

Objectives of the Study

The objectives of this study were:

1. To review the literature related to the nutritional status of the world population, with special concern for Panama, its relationship

to food habits and the role of nutrition education in improving food habits.

2. To gather data about food buying habits and preparation techniques in relation to good sources of vitamin A and iron among a selected sample of Panamanian homemakers with special concern to the residential background of the homemaker, the composition of her family, her level of education, and her age.

3. To use the results of this research to draw implications for teaching nutrition at the college level in Panama.

Procedure

The following procedure was used to attain the objectives of this study.

To fulfill objective one, regarding the review of literature, the following were reviewed:

a. The nutritional status of the world population as assessed by nutritional surveys.

b. Factors influencing food habits.

c. Methods of surveying food habits.

d. The importance of nutrition education in the improvement of the nutritional status of the people and considerations to plan and implement an effective program.

e. Food sources of vitamin A and iron and the effect of preparation techniques upon nutrient conservation.

To fulfill objective two, regarding data gathering:

a. Define the criteria for selecting the group to be studied.

b. Enlist the assistance of the home economist responsible for

the program on consumer education at the "Centro de Salud del Mercado" (Health Center at the Market) in procuring the subjects to be studied.

c. Select the good food sources of vitamin A and iron which were included in the interview schedule.

d. Develop an interview schedule designed for the Panamanian homemakers (Appendix A).

e. Pre-test the interview schedule with individuals as similar as possible to the target population.

f. Revise the interview schedule based upon the results of the pre-test.

g. Interview the subjects selected to be participants in the study.

h. Analyze the data gathered according to (1) frequency of buying good food sources of vitamin A and iron in relation to the age of the homemaker, the educational level of the homemaker and the husband, the composition of the family, and the residential background of the homemaker, and (2) preparation techniques practiced by the group as a whole.

To fulfill objective three, regarding the use of the results from the interview schedule:

a. Draw implications for a nutrition course in the School of Home Economics of the University of Panama on the basis of the analysis of the data.

Limitations

The following limitations were placed upon this study:

1. The study was limited to a selected sample of homemakers living in Panama City, whose families consisted of more than two members.

2. The study was limited to buying habits and preparation techniques of vitamin A and iron rich foods.

3. The factors to be studied were limited to: (1) the age of the homemaker, (2) composition of the family, (3) education of the homemaker and the husband, and (4) residential background of the participant.

4. The instrument was first developed in English and then translated into Spanish. The colloquial Spanish used in Panama City was used, regardless of grammatical perfection.

5. The foods included in the interview schedule were those usually available in Panama.

Definition of Terms

Throughout this study the following definitions will be used:

Recommended Dietary Allowances (RDA): numerical expressions of the quantities of certain nutrients needed by individuals to maintain a healthy nutritional status plus an amount added for safety (Guthrie, 1971). The RDA used in Central America have been set up by the Institute of Nutrition of Central America and Panama.

Good food source of vitamin A and/or iron: those foods for which one serving provides at least twenty-five per cent of the RDA as set by the Institute of Nutrition of Central America and Panama plus those

foods used in a quantity large enough to provide an appreciable amount of either or both nutrients.

Food habits: "habits of a group that reflect the way a culture standardizes behavior of the individuals in the group in relation to food so that the group comes to have a common pattern of eating" (Lowenberg, 1968).

Urban: a town of over 25,000 in population (INCAP, 1969).

Rural: a village of less than 25,000 in population.

Nutrition education: "is the process by which beliefs, attitudes and understandings about food lead to habits that are nutritionally sound, practical, and consistent with individual needs and available resources" (Todhunter, 1969).

Description of foods used in the interview schedule:

Incaparina: a flour-like cottonseed-corn mixture fortified with essential amino acids and other selected nutrients so that, when made into a drink, the nutritional composition is similar to that of milk (Appendix B, page 85).

Plantain: a starchy fruit similar to the banana. It is widely used as a vegetable throughout Central America.

Mamey: a tropical fruit about the size and shape of a grapefruit. It has a granulated brownish outer skin and a black seed about one and one-half to two inches in diameter. The remainder is the edible part. The color is very deep reddish yellow, and it has a soft texture.

Byrsonima (Nance): a very small, round tropical fruit about one-half inch in diameter. It has a black seed about one-fourth inch in diameter. The edible part is composed of a whitish pulp and a yellow

skin. It is an oily fruit with a tart flavor. It is eaten in the raw state and also made into a drink.

Peachpalm fruit (pijibaye or pixvae): a starchy fruit similar in shape and size to a plum. The color of the outer skin varies from a combination of green and orange to a deep reddish orange, depending on the variety. It has a black seed about the size of a grape. The pulp is the edible part and is deep yellow. It has to be boiled before it is eaten.

Mombin (Jobo): a tropical fruit whose size and shape is similar to the cherry tomato. It has a very large white seed, thus leaving very little pulp to be eaten. The edible part is made up of this pulp and the skin, which varies from green to yellow according to the stage of ripeness.

Pigeon peas: small, rounded, green legumes similar to green peas.

Jackbean: white lima beans.

Summary

This chapter has included the statement and objectives of the study as well as the procedure to fulfill the objectives. The limitations placed upon the study, the definition of terms, and the description of the tropical foods listed in the interview schedule are described in this chapter.

The organization of the remainder of the thesis will be: Chapter II, Review of Literature; Chapter III, Methods of Procedure; Chapter IV, Analysis and Interpretation of Data; Chapter V, Implications

for Nutrition Education; and Chapter VI, Summary, Conclusions and Recommendations.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Knowledge about the factors influencing food habits and about the nutritional status of a population should be guiding principles to any nutritional program. These factors are stressed throughout this chapter with special consideration for the role of nutrition education as one effective way to help people improve their diets.

The last part of the chapter presents the Panamanian situation. It deals specifically with (1) the present nutritional status of the population and (2) the place of home economics within the educational system of the country.

World Nutrition

Lack of enough food and inadequate use of food resources already available are considered to be the two greatest factors responsible for hunger and malnutrition throughout the world, and especially in the countries of Africa, Asia, the Middle East, and Latin America (Burgess, 1963; Lowenberg, 1968; Huth, 1969). The production of enough protein food is already insufficient to meet the needs of the world population. The situation becomes worse in the developing countries where malnutrition is more widespread. Also, in these regions transportation

facilities for food are limited, as is preservation equipment for both commercial and home use (Scrimshaw, 1959).

Constant research in nutrition and related fields is increasing the knowledge available about the relationship between food and man. At the same time, the way to assess the nutritional status of people has improved. Many nutritional surveys, both in large and small populations, demonstrate the fact that over one half of the world population live on sub-optimal nutritional status (Huth, 1969; Robinson, 1972). Studies done by international, regional, and national organizations have revealed the main nutritional problems confronted in today's world.

The Interdepartmental Committee on Nutrition for National Defense

The Interdepartmental Committee on Nutrition for National Defense (ICNND) of the United States has conducted, along with local governments and institutions, nutritional surveys in many countries around the world. Those chosen to be reported here are the surveys done in Ethiopia, Thailand, Northeast Brazil, Lebanon, the West Indies, and Ecuador.

All of these surveys were undertaken as a joint effort of scientists from the United States and the host country. The surveys included research about the nutritional status of the population and selected environmental conditions on food availability of the countries. The nutritional status of the population was directly assessed through (1) clinical examinations of deficiency symptoms, (2) dental examinations, and (3) biochemical analysis of blood, urine and stool specimens.

Some of the aspects studied were the food availability of the countries, including farming techniques, food storage facilities, and food industries.

The results of the nutritional assessment of people revealed that these countries had similar nutritional problems. Low intake of riboflavin, iron and iodine was prevalent in five of the six countries under study. Low intake of protein, vitamin A and thiamine were nutritional problems among the population of four of the countries. In three of them a general caloric deficit in the daily diet was found (ICNND, 1959; 1960; 1961; May, 1962; June, 1962; 1965).

The World Health Organization of the United Nations

The World Health Organization of the United Nations has also sponsored many nutritional surveys. These studies show the same state of affairs as the ones summarized above. Of particular significance have been the studies on nutritional anemia. These studies have shown that this nutritional problem is widespread throughout the world, even though it is more prevalent in developing countries. It is of special concern among pregnant women.

The results of these studies show that the prevalence of anemia during the second and third trimester of pregnancy has a wide range. In some countries it is a problem in 21 per cent of the persons in this group, while in other countries nutritional anemia was found in 80 per cent of pregnant women.

The Institute of Nutrition of Central America and Panama

The Institute of Nutrition of Central America and Panama has also conducted nutritional surveys among the population of its member countries. The studies done have included the direct assessment of the nutritional status of the population, dietary surveys, and research on the food situation of the countries and their capacity to fulfill the needs of the people. The survey done in Panama in 1967 (INCAP, 1969) surveyed all of these conditions in the country. The results of the research have revealed the main nutritional problems found among the population. Again, the results were similar to those reported above for other developing countries. Children were found to be especially deficient in calories, protein, and vitamin A. The population as a whole was classified as deficient in calories, vitamin A, thiamine, riboflavin, iron, folates, and iodine.

Studies similar to those summarized above have made it possible for scientists to become aware of the leading nutritional problems around the world. Specific nutritional deficiencies indicate public health problems of particular concern in developing countries due to the large percentage of the population in which they are manifested, as well as their severity when present. It is thus possible to conclude that the main nutritional problems are (Scrimshaw, 1959; Lowenberg, 1968; Robinson, 1972):

1. protein-calorie malnutrition
2. inadequate intake of iron
3. low intake of vitamin A
4. riboflavin deficiency

Other nutritional deficiencies, even though not as widespread or to the same degree as the ones mentioned above, are of worldwide concern. The results of these deficiencies are manifested as:

1. goiter, due to lack of iodine rich foods
2. rickets, as a result of an inadequate intake of vitamin D
3. scurvy, due to lack of vitamin C
4. pellagra, due to niacin deficiency
5. beriberi, due to a lack of thiamine (Lowenberg, 1969; Robinson, 1972).

Recognition of the deficiencies and their location is considered to be one of the greatest advances in world nutrition. It is now possible for many international, regional, and national organizations to focus their nutritional programs upon realistic bases. The outcome has been the planning, development and implementation of nutritional programs based on the recognized needs of different countries (Scrimshaw, 1959).

The Panamanian Situation

Panama belongs to the group of six small countries which make up the Central American Isthmus. It lies eight degrees above the equator. Thus, it has hot and humid weather all year round. It is a member country of the Institute of Nutrition of Central America and Panama (INCAP).

The nutritional situation of the population has been assessed by INCAP. Research done in 1961 showed that Panama had the lowest intake of vitamin A and iron of all the Central American countries. This research was based on seven-day meal records kept by randomly selected

families in thirty communities throughout Central America. From these seven-day meal records the daily intake of food and nutrients per person were averaged. This survey revealed that the average intake of vitamin A per person in Panama was 438 International Units for the rural population as compared to 338 for the urban dwellers. This survey also reported a daily average intake of 12 milligrams of iron among rural persons and 14 milligrams among the urban population.

The results of this research also revealed that the average intake of vegetables per person in Panama was low, being only 6 grams (0.21 ounces) for the rural areas and 30 grams (1.05 ounces) among the urban people. An explanatory statement was made that these vegetables were mainly green corn and a type of squash. The average daily intake of fruits was 36 grams (1.27 ounces) for the rural population and 26 grams (0.91 ounces) for the urban. These intakes were considered to be low.

In 1967, the Institute of Nutrition of Central America and Panama conducted a national nutrition survey among a randomly selected sample of the total population of the country. The survey also included research on food availability of the country and its capacity to meet the demands of the growing population. The use of dietary surveys gave information about the general characteristics of the "typical" diet. The nutritional status of the population was assessed through clinical analysis of symptoms of nutritional deficiencies and anthropometric measurements. Wrist X-rays, samples of blood, urine and stool specimens were done on selected sub-samples of the group studied.

The results of this survey have revealed the main nutritional problems of the population. Among children, these are: (1) low intake of protein, (2) low intake of calories and (3) low intake of vitamin A.

The main nutritional problems of the population as a whole can be summarized to be: (1) a general caloric deficit, (2) low intake of vitamin A, (3) low intake of thiamine, (4) low intake of riboflavin, (5) low intake of folates, (6) low intake of iodine, and (7) low intake of iron (INCAP, 1969).

Factors Influencing Food Selection

The great nutritional challenge in today's world is to find an effective way to improve the health status of individuals by improving their diets. Any program which directly involves improving the food habits of individuals and groups should be based on the existing forces affecting already established eating habits. An understanding of food habits and knowledge about the nutritional status of a population should constitute the backbone of any nutritional program (Ritchie, 1950). The effectiveness of any such program depends on how well it meets the needs of the population (Cassel, 1957). Planning of nutritional programs should be based upon knowledge about the people and about the foods they eat. Such knowledge about the people includes "food patterns and customs, food supply and intake, and of nutritional status" (Ritchie, 1950).

To accomplish the major task of improving the food habits of individuals it has become necessary to study the factors which lead people to select food. According to Wenkam, the physical environment of the country or region and the cultural heritage of the people are the main causes which ultimately affect the choices of food made by the people (Wenkam, 1969).

Physical Environment

The food included in consumption surveys which have been carried on in different places indicate a variety of foods which are strange to persons not familiar with the area. Starchy roots known as "yuca, yautía, malanga and ñame" as well as starchy fruits known as "plantain and breadfruit" were some of the foods included in the research done among Puerto Rican families (Roberts and Stefani, 1949). The list of foods also included "guanábana and mamey," which grow wild on the Island. These tropical foods are available to the population but are seldom found in places that do not have a tropical climate.

Other physical factors also influence the availability of food. These are the state of technological development of a country and the economy and economic status of the population (Lowenberg, 1968). Esquef (1972) reports on the diets of the peasants of the Bolivian Highlands. In this area of the country, food supplies are scarce and people lack cash resources to buy food, so their diet is made up of foods they can grow, usually cereals, tubers and legumes. The diet is also affected by the lack of fuel to cook food and the availability of fat to use for cooking. These peasants usually keep sheep but mainly for the purpose of producing wool for clothing. Egg production is limited and those eggs that are produced are usually sold for cash income. Milk is also very scarce and is used mostly to make cheese which can also be exchanged for money.

Diets of persons in the United States present a completely different picture. Here the consumer has a wide variety of foods available in different processed forms. The availability of foods either canned

or frozen has even lowered the consumption of fresh foods and has affected the eating habits of the population (Adelson, 1968; Parrish, 1971).

Income also affects food habits. The 1965 Household Consumption Survey in the United States revealed that as income went up the percentage of diets rated as "good" increased. Also, the percentage of "poor" diets decreased (Adelson, 1968). Fernández et al. (1971) also report that Puerto Rican families with higher incomes had more variety in their diets, thus implying that income does affect the diet of people.

Cultural Heritage

A second factor that shapes the food habits of individuals is culture. It includes food taboos, superstitions, religion, food preparation techniques, meal patterns and even determining what is considered to be acceptable as food. All of these forces interact to shape an individual's food habits (Lowenberg, 1968; Wenkam, 1969; Lee, 1957).

Cassel (1957) reports the role of tradition as one major factor influencing the eating patterns of the Zulus in Africa. This group was eating what they believed to be the traditional diet their ancestors had eaten over the years. The program to improve food habits had to include research on the eating patterns of previous generations before any attempt was made to improve their eating habits. Customs and beliefs affected egg and milk consumption among the persons in this tribe. Eggs were considered uneconomical to eat. They were considered a sign of avarice and also believed to make girls licentious. Milk consumption was also associated with strong beliefs. People could

drink only milk produced by the animals of their own kin group. Women were also regarded as having an evil influence on cattle during menstruation and pregnancy. The easiest solution for them was to exclude milk from the diet of women beyond puberty. Once a woman married, the situation became worse because she was then living in a different kin group. So, milk was almost completely out of the women's diets. Therefore, in order to help solve the problem of poor nutrition for this group, powdered milk was introduced. Only through understanding of the culture and customs of the Zulu tribe was it possible to find a solution to this problem.

Interaction of the Factors

The task ahead is to discover how the physical environment and the cultural heritage influence an individual's or a family's food habits. This has led researchers to investigate how different conditions within the physical and cultural environment of the individual influence his food choices. Lewin (1943) felt that an answer to the question "why people eat what they eat" could be sought if the question "how food comes to the table and why" could be answered. He felt that somebody in a family was responsible for selecting the food that was eaten. He called this person the "gatekeeper." He emphasized that knowledge about the "gatekeeper's" immediate environment and cultural heritage could help solve the problem. An investigation was made to determine who the "gatekeeper" was. The group researched included housewives from a midwestern town who belonged to three different income levels and to two different sub-cultural groups. Lewin also investigated whether or not selected characteristics within these groups altered the

"gatekeeper's" attitudes toward food selection. He found that in all the groups he selected to study the "gatekeeper" was the wife. Four of the groups regarded meat to be "husband's food" and vegetables as "children's foods." So the presence of a husband and children in the home was influencing the homemakers' decisions about foods.

Lamken, Hielscher and Janes (1970) also found that the presence of preschool children in the home influenced the mother's food purchasing habits. Their research revealed that larger quantities of cookies, bananas, peanut butter, canned soups, sweetened cereals, and powdered beverage mixes were bought at the children's request. Because food has so many other connotations, besides satisfying hunger, such as security and hospitality and friendship, homemakers find that serving foods requested is one way to please their family members.

Age is another condition which alters the homemakers' decisions about the foods to serve the family. Young homemakers are more apt to experiment with new foods than older ones (Burgess, 1963). Young, Berresford and Waldner (1956) found that young homemakers, those under forty years of age, did a better job of feeding their families than did the middle aged or older homemaker. A higher percentage of younger women included all of the Basic Seven Food Groups in their meals, thus positively influencing the consumption of milk and citrus fruits which were low in the diet of the other groups. Also, younger women had better breakfast and luncheon habits.

Lamkin, Hielscher and Janes' (1970) study included the use of a food budget and the preparation of a shopping list as indicators of efficiency in food buying practices. They found that a food budget was prepared by a large percentage of homemakers. It was especially

related to the age of the respondent. A larger proportion of women under thirty years of age used a spending plan. This may have been due to the fact that they have less money to spend than the homemakers of established families.

In the same study, the use of a shopping list was related to the educational level of the homemaker. College graduates always used a shopping list. This adds one more variable influencing homemakers' habits about foods.

The educational level of the homemaker has been found to influence the food consumption pattern of the homemaker. The educational level of the woman was positively correlated with nutritional knowledge. As the level of education went up so also did the percentage of homemakers who included foods from all food groups. The use of foods from the milk and the citrus, tomato or cabbage groups increased as the nutritional knowledge of the homemaker increased (Young, Berresford, Waldner, 1956).

Nutrition Education

Increasing knowledge about the role of food as one important component of health has brought about increased concern about effective ways to help alleviate the problems of world nutrition. Nutrition has been described as an "'action' science," thus implying that scientific knowledge needs to be effectively transmitted to individuals. Nutrition needs to be put into "action" by persons in order for them to be able to receive its benefits (Johnson, 1965).

Man does not possess an inborn instinct to guide him toward the selection of a balanced diet. Individuals need to be taught to choose those foods which will contribute all the nutrients needed by the

human body (Todhunter, 1969; Eppright, Pattison and Barbour, 1971). Unfortunately, food availability and increased income are factors which do not insure adequate nutrition. This is readily identified by observing the trend of American diets during the ten-year period between 1955 and 1965 (Adelson, 1968).

The results of comparing the Household Consumption Surveys of 1955 and 1965 revealed that in the United States the nutritional adequacy of the diets went down during the ten-year period. The percentage of diets rated as "poor" by the United States Department of Agriculture increased from 15 to 21 per cent. Consequently, the diets classified as "good" decreased from 60 to 50 per cent during the same period. "Good" diets were considered to be those which met two thirds or more of the Recommended Dietary Allowances for protein, calcium, iron, vitamin A value, thiamine, riboflavin and ascorbic acid. "Poor" diets were considered to be those which were below two thirds of the Recommended Dietary Allowances in one or more of the same nutrients. When the diets were compared on the basis of the Basic Four Food Groups it revealed that meat was the only group which showed an increased consumption. Consumption of foods from the milk, vegetable-fruit and bread-cereals groups went down from 1955 to 1965. So, the percentage of diets that did not meet the Recommended Dietary Allowances for calcium, vitamin A value, thiamine and ascorbic acid increased (Adelson, 1968).

The 1965 Household Consumption Survey also revealed that diets rated as "poor" were found in all income categories. Even though they were more prevalent at the lower income level, households in which income was $10,000 per year and over also consumed diets rated as "poor."

Stewart (1972) states that even though a United States nationwide report on the nutritional status of teenagers is not available, several trends can be identified from research done on small groups. These data indicate that the main nutritional problems among teenagers are anemia, dental caries, and obesity. Iron intake is low among this group, as is also calcium and vitamins A and C.

The nutritional imbalances found in the United States do point to the fact that all individuals need to be taught how to select a balanced diet. People need nutrition education. Dowell (1969) found a low but positive relationship between knowledge about health practices and improved health practices. Eppright et al. (1970) also reported that homemakers who had knowledge about nutrition fed their families a better diet than those housewives with little knowledge.

The ultimate goal of nutrition education is to teach people to select, prepare and eat a diet which will meet the nutritional requirements of the body. An important part of the effectiveness of any nutritional program lies in planning and organizing programs which meet the following requirements: (1) the needs of the population are met (Cassel, 1957; Ritchie, 1971), (2) the recommendations are within the reach of the population, physically, culturally and economically (Burgess, 1961; Johnson, 1965; Eppright, 1971), and (3) the information is transmitted to the people in an understandable way (Johnson, 1965; Ritchie, 1971).

The first two requirements are based on knowledge about the characteristics of the people and the environment. Such knowledge should lead to a program which can be approached on a realistic basis. Ritchie (1950) states that

> Knowledge of food patterns and customs, food supply and intake, and of nutritional status is needed to define the nutritional situation of a country or community. From this information it is possible to assess the need for an educational program and to obtain some indication of the lines it should follow.

The last requirement of an effective nutritional program is to transmit the information in a clear and understandable way to the target group. It implies an adequate professional preparation of the person who is directly responsible for working with the people. Also, the personal characteristics of this person are important considerations.

Cassel (1957) reports on the effectiveness of a nutritional program for adding eggs and milk to the diet planned by the Pholela Health Centre in South Africa. The program was based on knowledge about food beliefs and customs held by the group. Such knowledge provided a practical and realistic basis to plan, develop and approach the program.

"Mothercraft Centers" operating in different countries rely on the principle of improving food habits of children by teaching mothers effective ways to use available resources. The program involves the mothers as active participants. They help to plan, buy and prepare the food that is served to their children. The resources available are as similar as possible to the ones the women have available at their own homes. Local foods are used to plan the diets, and the equipment available resembles that with which the women are familiar. These centers are becoming a very effective way to teach mothers the nutritional principles to plan a balanced diet. The mothers learn effective ways to plan better nutrition with the money that is available to them. At the same time, they learn cooking practices conducive to the maximum retention of nutrients (Sater, 1971; King, 1971). Mothercraft Centers

have operated on the principle of strengthening strong points of existing food habits and encouraging more frequent use of foods already accepted. Several authors have emphasized that it is easier to place the emphasis on improving food habits rather than on changing them (Ritchie, 1950; Todhunter, 1969).

Roberts and Stefani (1949) conducted an extensive islandwide research on family patterns in Puerto Rico. The researchers were interested in using the results of the survey to find the needs of the Puerto Rican families. They felt that knowledge about these needs should be the starting point to reorganize the home economics curriculum at the University of Puerto Rico.

Knowledge about the food habits of the population have been used to plan nutrition education programs. Whitehead (1947) used the results of seven-day diet records kept by students to determine the specific needs of the group. These revealed the points teachers needed to emphasize through teaching. The researcher served in an advisory capacity to the program for three years. The program was evaluated three years after the researcher's role as an adviser was over. She found that the teachers had continued to teach nutrition without her leadership. It was also found that the percentage of diets rated as "good" had improved from 1.6 to 31 percent. The diets of the students rated as "poor" had decreased from 38.9 to 4.7 percent since 1944 when the project was launched (Whitehead, 1952).

Home Economics in Panama

Home economics has been taught in the schools in Panama since 1920 (Villarreal, 1964). It is currently taught at the grammar school level as a compulsory subject to boys and girls. From seventh to ninth grades it is also a compulsory subject, but for girls only. At this level, home economics is taught once a week for a 90-minute session. In the normal school, home economics is also compulsory for all students in the tenth and twelfth grades only and it is offered through four class periods per week.

Panama does have one vocational home economics high school. This school is government supported. This school prepares students to become teachers of home economics at the grammar school level. Other home economics vocational courses are also offered and prepare students for the occupations of seamstress and lunch room administrator.

There are also some privately owned vocational home economics schools. These schools emphasize the vocational aspects of home economics related to cooking and sewing.

At the higher education level, the School of Home Economics has recently been started at the University of Panama. It functions under the College of Agronomy. It started by offering home economics education and extension home economics. At the present moment, these are the two fields which offer job opportunities for home economists. In April 1971 enrollment was offered for the first time at the School of Home Economics at the University of Panama. A total of 180 students were then enrolled.

Summary

This chapter contains a brief review of the nutritional status of the world population with special concern to the developing nations. Factors affecting food habits are also presented in this chapter as well as their implication for nutrition education. The need for nutrition education as well as the Panamanian situation in terms of the nutritional status of the population and the current situation of home economics within the educational system of the country is also discussed.

The procedure used to develop the instrument for the study is presented in Chapter III. This chapter will also present the procedure followed in the selection of the sample.

CHAPTER III

METHODS OF PROCEDURE

To accomplish the objectives of the study it was necessary to gather information about food buying habits and preparation techniques in relation to good food sources of vitamin A and iron from a sample of homemakers in Panama City. The selection of the sample and the development of the interview schedule for collecting the data for the study will be presented in this chapter.

Selection of Sample

This study was conducted in August, 1972. The homemakers used in the study were chosen through the assistance of a home economist responsible for a newly established program in consumer education conducted at the government-supported "Centro de Salud del Mercado" (Health Center at the Market) in Panama City. The market is located in a densely populated area of Panama City. It has been there for many years but was recently remodeled. At the time of the remodeling the Health Center was added. Thus the health facilities are easily accessible to the people who go to the market.

The home economist, who has a bachelor's degree in Home Economics from an American university, was employed by the government to help homemakers plan and prepare nutritious meals. It was possible for this

home economist to grant permission to the writer to interview the women who were attending the health center.

The selection of women to include in the study was made on the basis of the following criteria. First of all, they were to be homemakers, since the homemaker is the member of the household most likely to be responsible for buying and preparing the food for the family. Secondly, they were to belong to a family made up of more than two members, since it would be more likely that children would be included and thus be more representative of families in the country. Thirdly, they were to reside in Panama City since it was the buying habits of the population of this city that were of concern.

The health center, where the participants in the study were interviewed, is a small place. It has a waiting room preceded by a hallway where some seats are available. Many of the persons who attend the health center arrive early in the morning, between six and seven o'clock. They are admitted to see the doctor on a first come, first served basis. The writer approached individually the women present in the hallway at the "Centro de Salud del Mercado." The hallway was chosen because these persons were less likely to be called in to the doctor during the course of the interview. The writer introduced herself and explained that she was studying the kind of food people were buying in the market. The person was then asked if she was a homemaker, if there were more than two members in her family, and if she resided permanently in Panama City. If the woman did not meet these requirements, the writer thanked her and briefly explained to her why she did not fit into the group being studied. The writer found that several women contacted did not meet the requirements. Some were not

living permanently in Panama City and others, especially among older women, did not consider themselves as homemakers. This latter group usually lived with a daughter or some other relative.

If the person met the requirements, the purpose of the study was further explained as an interest in knowing more about foods that the Panamanian population were buying. Most women wanted to know more about the questions included in the interview schedule, so a brief description was given by the author. The woman was assured that the responses were going to be kept confidential and that the writer was going to be very grateful for her cooperation. Each woman was given the opportunity to decline if she did not wish to participate. Only one person that met the requirements refused to be interviewed. All other persons approached willingly responded to the interview. The writer felt that the respondent was more at ease if she could see what was happening. Thus, the interview schedule was in full view and many homemakers could see what was being recorded as they responded. The author found that most of the respondents were eager to converse and also to give some explanation about why they did or did not buy each particular food. A total of thirty-one homemakers responded to the interview.

Development of the Instrument

The interview schedule used for the study was developed by the researcher. It was first written in English and then translated into Spanish, Panama's official language. The common Panamanian name for the foods was used, as well as the common, everyday Spanish used in the country, regardless of grammatical perfection. The instrument

(Appendix A, page 81) was designed to obtain the following information: (1) general information about the subject, (2) buying habits of foods established as good sources of vitamin A and iron, (3) preparation techniques for the food bought, and (4) satisfaction with present buying habits.

Section 1. General Information. The first part contained information about the family and served as a means for selecting the participants. The questions were related to (1) whether or not the person was a homemaker, (2) if she resided permanently in Panama City, and (3) if there were more than two members in her family. This section also included a question on the presence of the husband in the home. Although this question was not used in the selection of the sample, it was considered to be one condition which could influence the homemakers' food buying habits.

Homemakers, rather than women in general, were chosen, because it was felt that they were the one person in a family who was most likely to be responsible for buying and preparing the food. For this reason they could easily give the information requested in the interview schedule. Since the study was concerned with food buying habits in Panama City, it was important that the homemakers be living permanently in that city at the time of the survey, regardless of previous residence background.

The second part of the general information section included questions on certain conditions which could influence the food buying practices of homemakers. These conditions of special concern were: (1) residential background of the homemaker, (2) effect of change in residence on eating habits, (3) level of education for both the

homemaker and her husband, (4) family composition, and (5) age of the respondent.

Section 2. Buying Habits of Foods Established as Good Sources of Vitamin A and Iron. This part of the interview schedule included a list of foods selected on the basis of (1) their availability to the Panamanian population and (2) their vitamin A and iron content. A standard procedure was followed by the author in order to determine if the vitamin A and iron content rendered the food as a good source of these nutrients.

First, the selection was based on the Recommended Dietary Allowances set up by the Institute of Nutrition of Central America and Panama for use in that area. These daily recommended allowances are different from those set up by the Food and Nutrition Board of the National Research Council of the United States. The vitamin A and iron recommended daily allowances for a Central American adult man weighing 55 kilograms (121 pounds) or a Central American adult woman weighing 50 kilograms (110 pounds) are 10 milligrams of iron and 1.3 milligrams of vitamin A. This amount of vitamin A is equivalent to 4,333 International Units on the basis that one milligram of vitamin A is the equivalent of 3,333 International Units. The RDA for iron for an adult man in the United States are 10 milligrams per day and for an adult woman are 18 milligrams per day. The RDA for vitamin A for both, an adult man and woman, are 5,000 International Units per day.

Secondly, the foods were considered to be a good source of vitamin A and iron if one serving of the food would provide approximately 25 percent of the RDA. One-serving portions were considered to be one cup of milk; one-half cup of fruit or one whole fruit; three ounces of

meat or three eggs; one-half cup of beans; one slice of bread or three-fourths cup cooked cereal. A second factor that affected the choice of food was if the quantity of food consumed would make a valuable contribution of vitamin A or iron to the diet. An example is the vitamin A content of milk and Incaparina.

The foods included for their high vitamin A content were: milk, (whole, either fresh, evaporated, or powdered), cheese (the equivalent to farmer's cheese or American), liver, eggs, Incaparina, dark green leafy vegetables, green and ripe plantain, sweet potato, squash, tomato, Chinese cucumber, peachpalm fruit, mango, papaya, breadfruit, mombin, byrsonima, watermelon, and apricots (canned or nectar).

The foods included for their high iron content were: liver and other variety meats, meat, dry codfish, eggs, Incaparina, dark green leafy vegetables, beans (red kidney beans, Jackbean), peas (pigeon peas, chick peas, split peas, green peas), creams of cereals and oats, bread, and yam.

Bread and creams of cereals were included because of the enrichment process. Flours made from rice, corn, plantain, rye, and oats are used as cooked breakfast cereals. Table I shows the proportions of nutrients added to the final product (see page 33).

Part II of the interview schedule also included questions on how each food was obtained--whether it was bought, produced at home or otherwise obtained. Frequency of buying and amounts bought during the week preceding the interview were also questioned (Appendix A, page 81).

The data gathered in relation to the foods the homemakers bought refer to those that were obtained by the respondents during the week immediately preceding the interview. The answer to the amounts bought

was recorded in terms of weight, quantities of the foods bought, or amount of money paid for the food, whichever was more familiar to the homemaker. The quantity of meat was usually expressed in terms of pounds bought, the response to evaporated milk was usually given in terms of cans and size of the cans bought, the answer to carrots and plantains was usually stated in terms of money paid for the products, such as ten cents' worth of carrots or plantains.

TABLE I

ENRICHMENT OF THE PRODUCT BY THE FLOUR MILLS**

Enrichment	Raw Material					
	Wheat	Rice	Corn	Plantain	Rye	Oat
Vitamin B_1	1.90	.24	.70	.40	.90	2.56
Vitamin B_2	1.15	.10	.30	.50	.30	.60
Niacin	13.70	2.50	3.60	2.80	2.80	2.90
Iron	12.00	11.30	9.10	18.20	14.90	23.60
Calcium	1100.00*					

*mg per 2.2 pounds
**INCAP, 1969, page 76

Section 3. Preparation Techniques. Multiple choice questions were developed to gather selected information about food preparation. The following information was sought: (1) person in the home usually responsible for cooking, (2) usual procedure for preparing vegetables, (3) usual way to dispose of vegetable liquid, and (4) procedure followed to rinse the meat.

Some of the nutrients contained in foods are affected by preparation techniques. In this study, the practices followed by the people could influence the iron content of the food. Vitamin A is stable under usual preparation practices. This section was then included in order to find out who was the person responsible for cooking and the actual procedures followed. The results could lead to an evaluation of practices to encourage as well as those that needed improvement in order to avoid nutrient loss through preparation techniques.

Section 4. Satisfaction with Present Buying Habits. The last two questions were "Assuming you had an additional $20 to spend monthly, would you spend more money on food?" and "If you spent all or part of that money for food, what kind of food would you buy?" The intent of these questions was to gain some information about how homemakers felt concerning the food they were purchasing. Did they feel their diets were adequate and, second, what did they consider were important foods to purchase?

Pre-Testing the Instrument

The interview schedule was pre-tested on nine women. The pre-testing sample was also selected from women at the "Centro de Salud del Mercado." This part of the survey proved to be a valuable experience. It provided the opportunity for the writer herself to become acquainted with the interviewing technique. Each interview took approximately fifteen minutes to be completed.

It was learned that some information was easier to gather than had been anticipated. The presence of the husband in the home and the age

of the respondent are two examples of this kind of information.

The homemakers were found to be more at ease if they knew what the interview schedule was about and if they could see what was being marked as they responded to the interview. Thus for the sample group more information was given to the subjects before starting the interview and the schedules were marked in full view of each respondent.

It was learned that the homemaker needed time to think before she answered. Also, the interviewer learned that it was important for her to be able to listen when the homemaker wanted to converse. Many times the homemaker would give a long explanation about how she used specific foods and why she bought them, in terms of special family members. It was important to learn ways to bring the homemaker back to the interview without giving the impression of lack of interest in her remarks.

As a result of the pre-test it was decided that the question concerning the presence of the husband in the home should be reworded. The question was changed from "What is your relationship with the other adults in your family?" to a direct statement, "Does your husband live with you?"

Also the list of foods was slightly modified. Mombin and watermelon were withdrawn because they were completely out of season, and Chinese cucumber was added.

Summary

This chapter contains the procedure followed in this study in order to select the sample and to set the criteria to develop the interview schedule. This interview schedule had four sections: (1) general information, (2) list of foods considered good sources of vitamin A and iron, (3) preparation techniques, and (4) the homemakers' satisfaction with their present buying habits.

The results of the survey will be presented in Chapter IV. This chapter will also contain the implications for teaching nutrition in the School of Home Economics at the University of Panama.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter includes the analysis of the data gathered through the interview schedule. Thus, it deals with objective two of the study, which was to gather information about food buying habits and preparation techniques in relation to good food sources of vitamin A and iron.

Buying Habits of Good Food Sources of Vitamin A and Iron

The vitamin A and iron rich foods purchased by the homemakers during the week preceding the interview were first analyzed. This analysis revealed the absence of home food production. All of the foods included in the interview schedule were either purchased by the homemakers or were sent to the homemakers from people, usually relatives, living some place outside Panama City.

Further analysis of the foods purchased was done to identify those foods which the homemakers had or had not bought in sufficient amounts to provide needed amounts of vitamin A and iron. It was assumed that the food was consumed and that it was accepted by the families of the homemakers. It was thought best to study those foods that were presently used by the homemakers and to plan to implement a nutritional program aiming at higher levels of consumption of already accepted foods rather

than changing established practices.

The foods bought, regardless of quantities, are presented in descending order in Table II on the following page. The food which was reported as purchased by all 31 homemakers, as expected, was bread. Thirty of the group purchased meat, other than variety meats. Evaporated milk was purchased by 29 of the group, possibly because this is commonly used with coffee. Red kidney beans and lentils and green plantain were purchased by 90 percent of the group, indicating that these foods serve as staple foods of the Panamanian diet. A description of the Panamanian diet commonly mentioned is that it consists of rice, red kidney beans, meat and plantain. The above data also show this to be true with the group studied. Other foods that were purchased by more than 50 percent of the group were eggs, fresh tomatoes, creams of cereals and fresh carrots.

It was so near the end of the season for the last two foods on the list--breadfruit and mamey--that they were probably not available. Other foods purchased by very few of the homemakers were canned tomatoes, apricots and carrots. Canned foods are expensive items which were probably not bought because of the high cost.

Other foods that could have been bought by the homemakers but were not included were pijibaye and Incaparina. The former was fully in season when the study was done, but it is probably consumed more in terms of a treat food people buy on the street rather than as a fruit to include in the daily buying pattern. The low consumption of Incaparina can probably be attributed to ignorance about the food value of the item and/or to a lack of knowledge about ways it can be used.

These findings reveal foods already included in the diet of the

TABLE II

FOOD SOURCES OF VITAMIN A AND IRON REPORTED AS PURCHASED BY 31 PANAMANIAN HOMEMAKERS

Food	Homemakers N = 31	
	N	%
Bread	31	100
Meat	30	96
Evaporated milk	29	93
Red kidney beans and lentils	28	90
Green plantain	28	90
Eggs	27	87
Fresh tomatoes	27	87
Creams of cereals and oats	27	87
Fresh carrots	25	80
Farmer's cheese	22	70
American cheese	22	70
Fresh milk	21	67
Green peas	18	58
Yam	18	58
Byrsonima	17	54
Mango	16	51
Apricot nectar	14	45
Papaya	10	32
Powdered whole milk	8	26
Variety meats, other than liver	8	26
Squash	8	26
Dk. green leafy vegetables	7	22
Liver	5	16
Dry codfish	5	16
Pigeon peas	5	16
Split peas	5	16
Incaparina	2	6
Canned carrots	2	6
Chinese cucumber	2	6
Pijibaye	2	6
Apricots	2	6
Jackbeans	2	6
Canned tomatoes	2	6
Breadfruit	1	3
Mamey	0	0

persons surveyed. A larger consumption of these foods, in terms of either quantity or frequency, would supply the diet with needed amounts of vitamin A and iron.

The amount of food consumed by an individual determines the amount of nutrients obtained. Thus a further analysis was made concerning the amount of food bought. Selected foods were chosen to be presented in terms of the amount of food provided per family member per day, regardless of sex, age, activity, cooking loss and assuming that the food was equally divided among the family members. These averages were calculated by adding the weekly amount of the food reported as being purchased by all 31 homemakers. This total was then divided by the total number of family members represented in the study. This figure was then divided by the number of days in a week (seven) in order to arrive at a daily proportion for each family member represented in the study. Thus, the amount of meat, including liver and other variety meats, averaged 105 grams per person per day, or roughly 3.7 ounces. The total amount of legumes provided by the foods the homemakers reported as purchased averaged 27 grams per person per day, or roughly 0.92 ounces, even though beans and lentils were widely bought. Table III (see the following page) summarizes the results in terms of amounts per person per day.

Comparison of Foods Purchased by Two Homemakers

The interview schedules of two homemakers were selected to be compared in relation to the vitamin A and iron content of the foods bought by the homemakers. Cooking losses were not studied. The selection was aimed at one interview schedule in which the foods bought could lead to

adequate or close to adequate amounts of vitamin A and iron in the diet for each of the family members, and at another in which the foods purchased provided low amounts of these nutrients. Thus, one interview schedule was selected to represent a "good" diet and another to represent a "poor" diet.

TABLE III

DAILY PROPORTION OF SELECTED FOODS CALCULATED FOR EACH OF THE 197 FAMILY MEMBERS REPRESENTED BY THE 31 HOMEMAKERS

Food	Average amount per person per day
Meat, liver and other variety meats	105 grams
Red kidney beans, lentils and other legumes	27 grams
Fresh tomato	23 grams
Byrsonima	16 grams
Farmer's cheese	7 grams
American cheese	5 grams
Fresh milk	105 milliliters
Eggs	.39 egg
Plantain (green)	.37 plantain
Plantain (ripe)	.36 plantain

The "good" diet had a vitamin A content of 4,886 International Units per person per day while the "poor" diet had 2,622 International Units of vitamin A per family member per day. When the iron content of these two diets was compared, there were 11.9 milligrams per person per day in the "good" diet and only 5.8 milligrams per person per day in the "poor" diet. The wide range of difference in the foods bought

by the homemakers was thus revealed. Interestingly, the homemaker who bought the foods represented in the "good" diet had more than six years of formal education, while the one who bought the foods included in the "poor" diet had less than six years of schooling. Both homemakers had three members in their families. Tables IV and V show the foods and the vitamin A and iron content of the "good" diet and the "poor" one.

TABLE IV

FOODS, VITAMIN A AND IRON CONTENT OF A SELECTED "GOOD" DIET

Food	Amount	Vitamin A IU	Iron mg
Fresh milk	7 l	8,800	2.8
Evaporated milk	13 fl oz	1,316	.5
Farmer's cheese	.5 lb	530	.9
American cheese	.25 lb	1,380	1.0
Variety meats other than liver	1 lb	350	4.1
Meat	3 lb	---	54.5
Eggs	1 doz	7,080	13.2
Fresh carrots	1 lb	29,440	1.9
Plantains	18 plantains	10,500	14.4
Fresh tomato	1 lb	4,080	2.3
Mango	6 mangos	28,180	2.4
Byrsonima	.20 gal	303	9.1
Apricot nectar	60 fl oz	17,850	3.8
Beans and lentils	2 lb	270	21.0
Split peas	1 lb	500	21.0
Green peas	8 oz	1,020	3.9
Creams of cereals and oats	200 gm	---	9.0
Bread	42 rolls	---	33.6
Yam	2 lb	---	11.8
TOTAL - WEEK		102,601	250.0
Per person per day		4,886	11.9

TABLE V

FOODS, VITAMIN A AND IRON CONTENT OF A SELECTED "POOR" DIET

Food	Amount	Vitamin A IU	Iron mg
Evaporated milk	16 fl oz	1,620	.6
Powdered milk	4 lb	20,480	8.8
Meat	1.5 lb	---	27.3
Eggs	7 eggs	4,130	7.7
Plantains	8 plantains	4,667	6.4
Fresh tomato	3 lb	12,240	6.9
Byrsonima	1 gal	1,515	45.5
Apricot nectar	60 fl oz	10,413	2.2
Creams of cereals and oats	150 gm	---	6.8
Bread	12 rolls	---	9.2
TOTAL - WEEK		55,065	121.4
Per person per day		2,622	5.8

Analysis of Food Buying Habits According to Selected Variables

Since the study was concerned with the food buying habits of homemakers, the foods bought by the participants were next analyzed in terms of the selected variables included in the general information part of the interview schedule. Through this procedure it was possible to determine if any of these variables had an influence on the homemakers' buying habits. To analyze the foods purchased in terms of these variables, the sample was divided into two sub-groups for each variable. It was considered that the variable had an apparent influence on the homemakers' buying habits if the percentage of respondents in each sub-group that did buy the food differed from each other by

15 percent or over, regardless of quantities purchased.

Residential Background of the Homemaker

The rural and urban patterns of eating differ from each other in many instances. Thus, this became one of the factors to be studied.

The results of the survey showed that 36 percent of the homemakers had always lived in an urban area. Sixty-four percent of the homemakers had originally lived in a rural area and were, at the time of the study, residing permanently in Panama City.

The homemakers that had a rural background were further analyzed to determine how long they had resided in the City. Over 60 percent of these homemakers had migrated to Panama City less than eleven years before. Table VI summarizes these results.

TABLE VI

YEARS OF RESIDENCE IN PANAMA CITY OF HOMEMAKERS WITH A RURAL BACKGROUND

Years of residence	Homemakers N = 20	
	N	%
Less than one year	3	15
1 - 5 years	6	30
6 - 10 years	3	15
11 - 15 years	5	25
Over 16 years	3	15
Total	20	100

All of the homemakers who had originally lived in a rural area were grouped together, regardless of the number of years they had been living in Panama City. The homemakers who had always lived in an urban area made up the other group.

When the data were reviewed based upon residency of the homemaker it was found that liver, eggs, and apricot nectar were the food sources of vitamin A bought by a higher percentage of rural homemakers than those with an urban background. The iron sources bought by a higher percentage of rural homemakers were liver, dry codfish, eggs, creams of cereals and yam. A greater number of homemakers with an urban background bought pigeon peas, a food included in the list for its iron content. The results are presented in Table VII.

TABLE VII

FOODS PURCHASED BY 15 PERCENT OR MORE OF THE HOMEMAKERS AS COMPARED TO THEIR RESIDENTIAL BACKGROUND

Food Purchased	Rural N = 20		Urban N = 11	
	N	%	N	%
Liver	5	25	1	9
Dry codfish	5	25	0	0
Apricot nectar	13	65	5	45
Cereal creams and oats	19	95	8	72
Yam	15	75	4	36
Pigeon peas	2	10	3	27

The rural group was further studied according to the years the homemaker had been living in Panama City. For this purpose this group was sub-divided into (1) the respondents who had been living in Panama City for less than five years, and (2) those who had been in Panama City for more than five years.

This sub-division was done in order to determine the homemakers' adaptation to the urban food patterns. Table VIII (on the following page) compares the buying habits of these two sub-groups. Cheese, a good food source of vitamin A, was bought by a higher percentage of homemakers who had been living in Panama City for less than five years. The same was true for green peas, an iron rich food. A higher percentage of homemakers who had been living in Panama City for more than five years bought the following good food sources of vitamin A: fresh and powdered whole milk, squash and mango. This same was true for the following food sources of iron: pigeon peas, split peas and yam.

The data in Table VIII imply that, as an over all trend, homemakers with a rural background had better buying habits than the women who had always lived in an urban area. Nevertheless, as far as this group is concerned the food buying habits of the homemakers improved as their length of living in Panama City increased. This could imply that the rural homemakers had accepted a greater variety of foods in their diets but that their buying habits were greatly affected by a change in residence. It may be that food buying habits improved as (1) they adjusted to living in an urban area and (2) employment opportunities materialized.

When the rural homemakers were asked, "Which foods did you eat at the place where you lived before that you are not eating now?" very few homemakers were able to give a specific answer. Most of them felt that

they were eating about the same. Of the few that did respond, three said that in their rural areas they had more fruits, two said it was easier to buy pork in the rural area, one said she ate "tortillas," and another mentioned "chicheme" (a drink made out of yellow corn and milk). The greater availability of fruits can be related to the fact that they grow wild in the rural areas of Panama and people usually reach for them on the tree. In Panama City the homemakers have to pay for them.

TABLE VIII

FOODS PURCHASED BY 15 PERCENT OR MORE OF THE HOMEMAKERS WITH A RURAL BACKGROUND AS COMPARED TO THEIR PERIOD OF RESIDENCE IN PANAMA CITY

	Homemakers with less than 5 yrs. residence N = 10		Homemakers with more than 5 yrs. residence N = 10	
	N	%	N	%
Fresh carrots	7	70	10	100
Whole fresh milk	6	60	8	80
Yam	6	60	9	90
Mango	4	40	7	70
Powdered whole milk	2	20	4	40
Squash	2	20	4	40
Split peas	1	10	3	30
Pigeon peas	0	0	2	20
Farmer's cheese	9	90	5	50
Green peas	7	70	4	40

When the same group of women were asked, "What food do you eat now that you did not eat in the place where you lived before?" again very few of them were able to give a specific answer. Most of them felt they ate the same foods, which could mean that their food habits have not been influenced by a change in residence. Nevertheless, those that were able to pinpoint an answer did so more in terms of quantity of food available rather than new ones introduced into their diet. They mentioned that it was easier to find vegetables, fish, meat and milk. Probably the storage facilities available to them had also improved as they moved to Panama City.

Level of Education of the Homemakers and the Husbands

The years of formal education were included as a second factor which could influence food buying habits. The group was analyzed in terms of the level of education of both the homemakers and the husbands.

The results of the analysis revealed that 67 percent of the respondents had six years of formal education or less. The same level of schooling had been attained by 46 percent of the husbands. Only three percent of the homemakers and eight percent of the husbands had over 12 years of formal education. Table IX (on the following page) summarizes the results.

As has already been mentioned, home economics as taught in Panama is compulsory for boys and girls from the first to the sixth grades and for girls only from the seventh through the ninth grades.

The group was divided into those homemakers who had attended school for six years or less and those that had schooling beyond the sixth grade. This analysis showed that green plantain, a vitamin A rich food,

was purchased by a larger percentage of those homemakers who had up to six years of school. A larger percentage of homemakers with more than six years of formal education bought fresh carrots, a vitamin A rich food; eggs, a good food source of both vitamin A and iron; and yam, a food included in the interview schedule for its iron content.

TABLE IX

YEARS OF FORMAL EDUCATION COMPLETED BY HOMEMAKERS AND THEIR HUSBANDS

Years of formal education completed	Homemakers N = 31		Husbands N = 24	
	N	%	N	%
No school	1	3	-	-
1 - 3 years	2	7	2	8
4 - 6 years	18	58	9	38
7 - 9 years	6	19	5	21
10 - 12 years	3	10	6	25
Over 12 years	1	3	2	8
Total	31	100	24	100

When the data were reviewed according to the husband's level of education it showed that in the group where the husband had up to a sixth grade education more homemakers bought dark green leafy vegetables, a good food source of vitamin A and iron, and squash, a vitamin A rich food. The other group, where the husband had over six years of formal education, a higher percentage of homemakers bought the following good food sources of vitamin A: fresh and powdered whole milk,

carrots and mangoes. This was also true for yam, an iron rich food. Table X shows the influence of the homemakers' and the husbands' levels of education upon the food purchasing habits of the homemakers.

TABLE X

INFLUENCE OF THE HOMEMAKERS' AND HUSBANDS' LEVEL OF EDUCATION ON THE FOOD PURCHASING HABITS

Food Purchased	Homemakers' Education N = 31				Husbands' Education N = 24			
	Less than 6 years		More than 6 years		Less than 6 years		More than 6 years	
	N	%	N	%	N	%	N	%
Green plantain	21	100	7	70				
Eggs	17	80	10	100				
Fresh carrots	15	71	10	100	9	72	12	92
Yam	11	52	7	70	5	45	9	69
Fresh milk					6	54	10	76
Powdered milk					1	9	5	38
Mango					5	45	8	61
Dk. green leafy vegetables					4	36	2	15
Squash					4	36	1	7

From the above table it can be concluded that the husband's level of education may have had more influence, even though slight, upon the food buying habits of the homemakers than did the homemakers' own level of education. As an over all trend, the educational level of either the homemaker or the husband did seem to influence the shopping habits. A higher percentage of homemakers having over a sixth grade education or whose husbands had over a sixth grade education tended to buy food

which was a good source of vitamin A and iron.

Composition of the Family

Because food is used to show appreciation for family members, the composition of the family was included as one variable which could influence the food buying practices of the homemakers. Two conditions were specially surveyed. These included (1) the presence or absence of the husband in the home and (2) the age of the children present in the household.

The husband was reported as being present in the home of 77 percent of the homemakers. The other 23 percent did not have their husbands living at home.

It was found that a total of 197 members were living in the households represented by the homemakers in the sample. The mean number of persons per household was 6.3. Of these persons adults represented 54 percent and children under 18 years of age represented the other 46 percent. The mean number of children per household was 2.9. Table XI (on the following page) summarizes the age categories of the children.

The sample was further analyzed in terms of the presence of the husband in the home and the age of the children. It was found that in those homes where the husbands were present a higher percentage of homemakers bought cheese and apricot nectar, both good food sources of vitamin A; eggs, a good source of vitamin A and iron; and creams of cereals and oats, included in the interview schedule for their content of iron.

TABLE XI

AGE CATEGORIES OF CHILDREN REPRESENTED BY THE HOMEMAKERS IN THE STUDY

Age categories of the children	Children N = 91	
	N	%
Under one year of age	6	6
1 - 5 years	23	25
6 - 11 years	35	39
12 - 17 years	27	30
Total	91	100

In those households where the husband was not present a larger percentage of homemakers bought liver, a good food source of vitamin A and iron; variety meats other than liver, included in the interview schedule for their contribution of iron to the diet; and squash, a vitamin A rich food. The results are summarized in Table XII (on the following page).

Considering that all other foods surveyed were purchased by about equal percentages of consumers, the difference in the foods purchased by those homemakers who did have their husbands at home can be interpreted in several ways. It may mean that the husband's presence in the home implies a higher income so more women could afford cheese and eggs, both expensive items in the Panamanian diet. It may also imply that the husbands do demand that more of these foods (cheese, eggs, apricot nectar, creams of cereals and oats) be served to them or that the women buy them because they want to please their husbands. The

fact that a higher percentage of women who do not have their husbands at home bought liver and other variety meats could mean that men reject these foods more often than women do.

TABLE XII

FOODS PURCHASED BY 15 PERCENT OR MORE OF THE HOMEMAKERS AS COMPARED TO THE PRESENCE OF THE HUSBAND IN THE HOME

Food Bought	Husband in the home N = 24		Husband not in the home N = 7	
	N	%	N	%
Farmer's cheese	18	75	4	57
American cheese	19	79	3	42
Eggs	22	91	5	71
Apricot nectar	12	50	2	28
Cereal creams and oats	23	95	4	57
Liver	2	8	3	42
Other variety meats	5	20	3	42
Squash	5	20	4	57

To analyze the extent of the influence of the children's age on the homemakers' food buying habits, only those households with children present were selected. They represented 94 percent of the total sample. The group who had children was divided into those homemakers whose children were under six years of age and those who also had children six years of age or over.

The data revealed that a higher percentage of homemakers with children under six years of age bought the following good food sources of vitamin A: powdered whole milk and mangoes. This was also true of

the following good sources of iron: variety meats other than liver, byrsonima and pigeon peas. A higher percentage of homemakers with children over six years of age bought liver, a good food source of vitamin A and iron; papaya, a tropical fruit rich in vitamin A; and red kidney beans and lentils and yam, which contains iron. Table XIII summarizes the influence of the children's age upon the buying habits of the homemaker.

TABLE XIII

FOODS PURCHASED BY 15 PERCENT OR MORE OF THE HOMEMAKERS AS COMPARED TO THE AGE OF CHILDREN

Food bought	Children under 6 years N = 16		Children over 6 years N = 13	
	N	%	N	%
Powdered whole milk	6	37	2	15
Variety meats other than liver	6	37	2	15
Mango	11	69	5	38
Byrsonima	11	69	4	31
Pigeon peas	4	25	1	8
Liver	0	0	4	31
Papaya	2	13	6	46
Red kidney beans & lentils	13	81	13	100
Yam	8	50	9	69

These results show that powdered whole milk was bought by a higher percentage of homemakers with children under six years of age, thus it is possible that it is given to the children. A higher percentage of these homemakers also bought the vitamin A rich mangoes and byrsonima,

a good source of iron, probably because children under six years eat less in amount than older children.

When the above group is compared to those homemakers who had children over six years of age, the data reveal that a higher percentage of homemakers in the latter group bought red kidney beans and lentils, iron rich foods, which add satiety value to the diet probably because of growing children.

Age of the Respondent

This was considered to be one of the factors which could cause food buying habits to differ. It was found that 39 percent of the homemakers were women under 30 years of age. The same percentage of women represented the 30-39 age category. Only 16 percent were in the 40-49 age range and 6 percent in the 50-59 age category.

The age of the homemakers influenced their shopping habits. In order to analyze whether or not this characteristic might influence food purchasing, the group was divided into those homemakers under 30 years of age and those over 30. The group under age 30 had 12 homemakers and those over 30 a total of 19 homemakers.

The findings for this group showed that a higher percentage of homemakers under 30 were buying whole powdered milk, canned carrots and apricot nectar, good food sources of vitamin A; and canned tomatoes, a food included in the interview schedule for its iron content. A higher percentage of homemakers over 30 were buying cheese (both the equivalent to farmer's cheese and American cheese), a good source of vitamin A, and green plantain, fresh tomatoes, green peas and yam, foods

considered to be sources of iron. The results are summarized in Table XIV.

TABLE XIV

FOODS PURCHASED BY 15 PERCENT OR MORE OF THE HOMEMAKERS AS COMPARED TO THE AGE OF THE HOMEMAKERS

Food bought	Homemakers under age 30 N = 12		Homemakers over age 30 N = 19	
	N	%	N	%
Powdered whole milk	5	42	4	21
Canned carrots	2	17	0	0
Canned tomatoes	2	17	0	0
Apricot nectar	9	75	9	47
Farmer's cheese	7	59	16	84
American cheese	7	59	15	79
Green plantain	10	83	19	100
Fresh tomatoes	9	75	18	95
Green peas	5	42	13	68
Yam	5	42	14	74

These data show that a higher percentage of younger homemakers bought processed foods. The same was true of powdered whole milk, probably because this age group is apt to have younger children in the family. Age also made a difference in the percentage of homemakers buying cheese, green plantain, fresh tomatoes, green peas and yam. A higher percentage of homemakers in the older group bought these foods.

Food Preparation Techniques

Person Responsible for Preparing Food

The preparation techniques were analyzed in terms of the total 31 homemakers who participated in the study. Table XV presents the data on the person in the household reported as responsible for food preparation. It reveals that in 74 percent of the households the homemakers alone were in charge of preparing the meals. Maids were not very frequently responsible for this household task since only six percent of the homemakers reported that a maid did the preparation. In only one of the homes was the daughter the person who did the food preparation. This was also true with an aunt and the homemaker's mother.

TABLE XV

PERSONS RESPONSIBLE FOR FOOD PREPARATION

	Homemakers N = 31	
	N	%
Homemaker herself	23	74
Homemaker and someone else	3	10
Maid	2	6
Daughter	1	3
Aunt	1	3
Homemaker's mother	1	3

From these results it can be implied that daughters, if present, did not share cooking responsibilities with their mothers. School age children are the ones currently being reached in home economics classes. The need is pointed out for home economists to encourage the students to use their homes to practice cooking principles and techniques learned at school.

Techniques of Preparing Foods

The survey revealed that vegetables were most frequently eaten in the raw state, as reported by 45 percent of the homemakers. The most common way to cook them was boiling as expressed by 29 percent of the respondents. The findings are summarized in Table XVI.

TABLE XVI

PREFERRED WAYS OF SERVING VEGETABLES

	Homemakers N = 31	
	N	%
Raw	14	45
Boiled	9	29
Raw and/or boiled	7	22
Raw and/or fried	1	3

From this survey it was also found that vegetables, when cooked, were usually used as an ingredient of another dish. This was true for 52 percent of the homemakers that participated in the research. These

homemakers peeled, cut the vegetables and added them to some other food. One homemaker stated that she never cooked vegetables. The remaining 45 percent did boil vegetables alone. Of this latter group, the most usual procedure was to boil the vegetables whole, unpeeled and in what the homemakers stated as little amounts of water. These results are summarized in Table XVII.

TABLE XVII

TECHNIQUES USED IN BOILING VEGETABLES

Technique used	Homemakers that used them N = 14	
	N	%
Boiled unpeeled	11	79
Boiled peeled	3	21
Boiled whole	9	64
Boiled cut	5	36
Little water	9	64
Lots of water	5	36

The usual procedure was to dispose of the liquid in which fresh vegetables were boiled. This was done by 93 percent of the homemakers who reported they boiled vegetables separately. Only one of the homemakers in this group reported that she usually added the liquid to the meat.

The liquid of canned vegetables was also thrown away. Only 16 of the total group reported that they never used canned vegetables. Of

the total group 19 percent of the homemakers said they used the liquid to cook the meat.

The only questions related to meat preparation techniques were related to the practice of rinsing the meat before it was cooked. These questions were asked in the belief that some of the iron content of the meat would be lost through this practice. It was found that only one homemaker did not rinse the meat before cooking it. All of the remaining participants reported rinsing the meat. The preferred way was to use a pan to rinse the meat. This procedure was used by 90 percent of the homemakers. The rest rinsed it under the faucet. Of those homemakers that used a pan, 50 percent rinsed it twice. The remainder of the women either rinsed the meat only once (30 percent) or three times (20 percent).

Attitudes Toward Diets and Food Preferences

When the homemakers were asked, "If you had an additional monthly income of $20, would you spend more money for food?" it was found that 64 percent of the participants responded affirmatively. It could be implied that they were not pleased with either the quantity or the quality of the food currently bought by them. A negative response was given to the question by 36 percent of the participants.

The homemakers that responded positively to the previous question were further asked what foods they would buy with the additional income. Their responses were classified as first choice or second choice, depending on what they mentioned first. Meat was the first choice of many homemakers, either in terms of increased amounts of

meat, improved quality of meat or to include a greater variety of meats in their diets. The results are summarized in Table XVIII.

TABLE XVIII

ADDITIONAL FOODS HOMEMAKERS WOULD PURCHASE WITH INCREASED INCOME

Food	First Choice N = 20		Second Choice N = 20	
	N	%	N	%
Better cuts of meat	4	20	3	15
More variety in meat	4	20	0	0
Vegetables	4	20	5	25
Fruits	3	15	2	10
More meat of same quality	2	10	3	15
Cereals	2	10	1	5
Milk	1	5	4	20
Beans			1	5
Oil			1	5

These results reveal that foods from animal sources along with vegetables head the list as first and second choices. These foods are expensive in Panama. Foods from animal sources and vegetables do not increase their yielding capacity when cooked, as cereals and beans do.

Incaparina should be extensively promoted as a meat extender. It provides good quality protein at a much lower price. Creative ways to use less expensive cuts of meat should be encouraged, thus making more money available for other foods.

Summary

This chapter contains the analysis of the data gathered through the use of the interview schedule.

The results of the survey presented here refer only to the group of homemakers that participated in the study and only to those foods included in the interview schedule. The results were presented in terms of (1) the foods bought, (2) preparation techniques, and (3) homemakers' evaluation of the adequacy of their diets.

Section 1. Foods Bought. The data gathered show that:

a. The most "popular" good food sources of vitamin A and iron were: bread, meat, evaporated milk, red kidney beans and lentils, plantain, eggs, fresh tomatoes, creams of cereals and oats, fresh carrots and cheese.

b. The less "popular" but also bought good food sources of vitamin A and iron were: apricot nectar, papaya, powdered whole milk, fresh milk, green peas, yam, byrsonima, mango, variety meats and liver, squash and dark green leafy vegetables.

c. Home food production of food was not practiced.

d. Better buying habits were found among homemakers with (1) rural background, (2) over six years of formal education or whose husbands had over six years of schooling, (3) their husbands at home, and (4) children under six years of age.

Section 2. Preparation Techniques. The results of this research suggest that:

a. The homemaker was the person usually responsible for cooking the food.

b. Most homemakers preferred to serve vegetables either raw or boiled.

c. Within this group vegetables were usually incorporated as ingredients of another dish and that when used this way they were peeled and cut before cooking.

d. When boiled alone vegetables were usually unpeeled, boiled whole, and in little water.

e. The usual procedure followed was to dispose of the liquid of cooked or canned vegetables.

f. Rinsing the meat was a widespread practice held by homemakers in this group. The meat was usually rinsed twice in a pan of water.

Section 3. Homemakers' Evaluation of the Adequacy of Their Own Diets. The survey revealed that:

a. Most homemakers felt their buying habits could be improved with increased income.

b. An increase in the amount, quality and variety of meats was a felt need of these homemakers as well as an increase in vegetables and fruits.

Chapter V will contain the implications for nutrition education.

CHAPTER V

IMPLICATIONS FOR NUTRITION EDUCATION

Presented in this chapter are the implications for nutrition education drawn from the results of the survey. The objectives and the suggested learning experiences are recommended to be included in a nutrition course in the School of Home Economics at the University of Panama. Thus, objective three of the study, which was to use the results of the survey to draw implications for nutrition education, is dealt with in this chapter.

Description of the Students

The students currently enrolled in the School of Home Economics at the University of Panama are studying to be either teachers at the high school level or extension workers. Thus, the results of this survey will be used to draw implications for a nutrition course aiming at the professional preparation of these students.

Objectives and Learning Experiences

The following objectives for nutrition education can be drawn from this survey:

Objective 1. To develop in the students knowledge and increased understanding of the nutritional status of the Panamanian population as assessed by the surveys reported by Flores (1961) and the Institute of

Nutrition of Central America and Panama (INCAP, 1969).

The dietary survey done by Flores (1961) revealed that the Panamanian population had low intakes of fruits and vegetables. The survey done by INCAP (1969) revealed that the main nutritional problems of the same population were (1) a general caloric deficit, (2) low intake of vitamin A, (3) low intake of iron, and (4) low intake of iodine. Since this survey directly assessed the nutritional status of the population through clinical and biochemical analysis, it represents the adequacy of the diet over a longer period of time than the previous survey.

Objective 2. To develop in the students an understanding that nutrition education is more effective when existing cultural patterns are improved rather than changed and when the program is based on the needs of the target group.

The results of the survey revealed the foods most widely bought by the participants in the study. The good food sources of vitamin A and iron which could be classified as "most widely used" are those bought by over 50 percent of the homemakers as reported in Table II, page 39. A more extensive use of some of these foods, either in terms of quantity or frequency, should be encouraged, such as plantain, red kidney beans, lentils, creams of cereals, oats, fresh carrots and yam. These foods are available throughout the year and are less expensive sources of the nutrients than animal products.

The results of this survey also revealed those foods accepted by a smaller percentage of homemakers. (See Table II, page 39.) The use of some of these foods could be encouraged, such as squash, dark green leafy vegetables and Incaparina. The promotion of the increased use of

Incaparina should be of special concern. It provides a less expensive source of vitamin A and iron, as well as many other nutrients, to the population. Special attention should be given to introducing it in the diet in creative ways, such as meat extender, cooked cereal even if mixed with the already accepted creams of cereals, or as a drink.

The results of this survey showed that the group of homemakers in this study were entirely consumers--not producers--of the foods included in the interview schedule, thus implying the need for consumer education among urban people. An important component of consumer education should be to stress the use of the Basic Three Food Groups as a guide for adequate nutrition. Students need to be very much concerned about the need for helping the group with whom they are working to achieve a workable knowledge about the use of the Food Groups. This would provide a means for the homemaker or the student to make use of seasonal foods without affecting the quality of their diets.

The results of this survey suggest that most homemakers felt the need to include more food in their diets. Meat was of special concern to many of the participants. But meat is an expensive food in Panama, so special emphasis needs to be given to creative ways to use the less expensive cuts of meat. This will make the food money of homemakers stretch further so they can buy vegetables and fruits.

Suggested Learning Experiences.

a. Have the students interview two or three persons and get a three-day dietary recall list of the foods these persons ate.

b. In class, discuss the findings to identify foods commonly used by most persons, with special concern given to those foods which are

good sources of the nutrients in which the Panamanian population is deficient.

c. Have the students work with the three-day diets they obtained and determine changes that will be necessary in order that the requirements of the Basic Three Food Groups will be met, with special concern to seasonal foods, cost and time of preparation required.

d. Have the students find out prices of selected foods at the public market, at the super markets, and at the corner stores during different times of the year.

e. Have the students make a list of some of the most nutritious and commonly eaten foods which can be produced in home gardens. This information can be used for the course identified in the Home Economics curriculum as Agriculture 400--Production of Food for the Family.

f. Have students investigate seasonal foods which will provide vitamin A and iron to the diet in the least expensive way possible.

g. Have the students find creative and economical ways to introduce Incaparina, vegetables and less expensive cuts of meat to the Panamanian diet.

Objective 3. To develop in the students an understanding of the important interaction between food preparation techniques and nutrient losses in foods, with special concern to good and poor practices held by the Panamanian population.

The results of this survey suggest food preparation practices to be enhanced as well as those that need to be improved. The use of vegetables in the raw state, as well as cooking them with other foods, should be intensified.

Special consideration should be given to the use of the liquid in which vegetables were either cooked or canned. This study has shown that the liquid is usually thrown away, indicating a lack of knowledge about the loss of nutrients or how to make use of the liquid in food preparation.

The practice of rinsing the meat should be one deserving very special concern. Flores (1961) found that the average iron consumption for the urban population of Panama was 14 milligrams per person per day. The daily average intake presented in the above study was calculated from the data gathered through the use of seven-day food consumption records. This finding is sharply contrasted with the results of the more extensive survey done by the Institute of Nutrition of Central America and Panama a few years later, which revealed that iron deficiency was prevalent in the urban population of the country. This leads to the question, "Can this widespread practice of rinsing the meat be partially responsible for the high prevalence of iron deficiency among the population?" Nevertheless, this practice cannot be completely discarded unless more is known about the reasons for following it. It would be more realistic, under the present conditions, to promote rinsing the meat once, quickly in a pan with little water or using a damp cloth.

Suggested Learning Experiences.

a. Have the students calculate the iron content of the diets obtained through the three-day dietary recall and compare the results to the nutritional status of the population as reported by the Institute of Nutrition of Central America and Panama.

Objective 4. To develop in the students an awareness of different ways in which nutrition can be practiced.

The results of this survey show that daughters, if present, did not participate in cooking in their homes. Due to the lack of equipment of many home economics departments in the high schools, teachers should greatly encourage the students to practice at home the techniques learned at school.

The extension home economist should try to reach the whole family. This survey revealed that the level of education of the husband, as well as his presence in the home, influenced the food buying habits of the homemakers. Efforts should be made to teach men the principles of good nutrition.

The extension home economist can encourage the practice of home gardening. This would provide a means to get the whole family involved in a nutrition activity. The products of the garden can be used to teach the homemaker creative ways to use food.

Summary

Implications for nutrition education drawn from the results of the survey are contained in this chapter. Presented are the objectives and suggested learning experiences to be included in a nutrition course at the college level.

Chapter VI contains the summary, the conclusions and the recommendations of the study.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the findings of a study undertaken to determine the buying habits and methods used to prepare foods among a group of homemakers in Panama City. The special concern of the study was with good food sources of vitamin A and iron since previous research has shown that the lack of these two nutrients are among the main nutritional problems afflicting the population of the country. The sample was selected from a group of homemakers present at the "Centro de Salud del Mercado" (a health clinic which adjoins a food market). The information was gathered through an interview schedule.

Summary and Conclusions

The homemakers who participated in the study were currently living in Panama City and belonged to families of from three to thirteen members. Most of the homemakers had originally lived in a rural area--previous to the time of the study--and their level of education ranged from no formal education at all to over twelve years of schooling. The husbands were present in most of the families and their level of education ranged from four years of formal education to over twelve years. The age of the homemakers varied from eighteen years to under sixty and the children's ages ranged from under one year to seventeen years.

The evidence indicated that the most widely bought foods were bread, meat other than variety meats, evaporated milk, red kidney beans and lentils, plantains, fresh tomatoes, creams of cereals and oats. Those foods purchased least during the period covered by the interview schedule were breadfruit, canned tomatoes, Jackbeans, apricots, pijibaye, Chinese cucumber, canned carrots and Incaparina.

The results of the survey also revealed that all the foods included in the interview schedule were reported as purchased, thus showing that the families represented in the study were consumers, not producers, of these foods.

The results of the study indicate that among this group of homemakers their residential background did influence their food buying habits. More of the homemakers who had originally lived in a rural area purchased good food sources of vitamin A and iron than did those respondents who had always lived in an urban place. It was also evident that among the homemakers with a rural background food buying habits improved as their length of residence in Panama City increased. Thus, it can be concluded that a change in the place of living did influence the homemakers' purchasing habits and that there is a period of adaptation to urban living.

The food buying habits of the homemakers who had over sixth grade education differed from those of the respondents who had less than six years of schooling. The same was found when the data were analyzed in terms of the husbands' level of education. The data revealed that in those households where the homemaker as well as her husband had over six years of formal education a higher percentage of women purchased foods that were rich in vitamin A and iron. The level of education of

the husband had a slightly greater influence on the buying habits than did the homemakers' own level of education. Thus, one can conclude that improved food buying habits were a reflection of more years of formal education.

The composition of the family caused food buying habits to differ among this group. A higher number of homemakers who had their husbands at home had slightly better buying habits than those who reported that the husband was not a family member. The same was true for those homemakers who had children under six years of age.

Food buying habits were different depending on the age of the respondent. The results of this study revealed that a higher percentage of homemakers over thirty years of age purchased food that was rich in vitamin A and iron than did those respondents under thirty years of age.

As an over all trend the food preparation techniques followed by the participants in preparing vegetables could be classified as good, as far as their effect on the vitamin A and iron content of the foods. Vegetables were most frequently served in the raw state. Boiling them was the preferred way to cook them and usually as components of another dish. Using vegetables in both of these ways should be enhanced.

The results of the survey revealed that the liquid of cooked fresh vegetables and canned ones was not commonly used. This practice should be improved and the use of the liquid from vegetables should be promoted.

This survey revealed that rinsing the meat before cooking was a very common practice. The most usual way was to rinse it twice in a

pan of water. This procedure should receive special consideration in any nutritional program.

The results of the survey revealed that a large percentage of homemakers felt their diets were inadequate. The most frequently felt need was for more expensive cuts of meat and for greater amounts of meat as well as being able to buy a larger variety of meats. Vegetables and fruits were seconds in the list of felt needs.

Recommendations

1. A nutrition course in the School of Home Economics at the University of Panama, or any other nutrition program, should be planned on a realistic basis. The nutritional status and food habits of the population as well as the resources available to the people should be given special consideration.

2. Based on the results of the survey which showed that fewer homemakers with an urban background were buying foods that were sources of vitamin A and iron, it is recommended that the present extension program be expanded to reach the urban population as well as the rural.

3. The results of the survey have revealed that the presence of the husband in the home and his level of education influenced the homemakers' buying habits, thus implying the need to teach boys and men the principles of good nutrition.

4. Based on the results of this survey which showed that the homemakers were mainly consumers, it is recommended that consumer education programs, such as the one currently being conducted at the "Centro de Salud del Mercado," be expanded to reach other sections of the population. Also, the home economics program at the high school level

should be oriented toward helping the students become better consumers.

5. Based on the results of this survey which showed an over all low level of consumption of good food sources of vitamin A and iron, it is recommended that home economics be introduced in the adult night schools and also that nutrition education be incorporated into the campaign against illiteracy.

6. The results of this survey showed that fewer of the homemakers under thirty years of age were buying good food sources of vitamin A and iron. It is recommended that nutrition education be imparted through short and informal talks at places where young people are especially eager to learn, such as maternity wards in hospitals.

7. The results of this survey showed the absence of home food production; it is thus recommended that every effort be made to promote this practice whenever possible at the urban as well as the rural level.

8. Further research is needed about food buying habits (a) in other areas of Panama City, (b) in the country as a whole, (c) involving people with different income levels, (d) during different times of the year, (e) concerning beliefs held by the people as they relate to practices which would affect the nutritional status of the population, and (f) the effect of the practice of washing meat on its iron content.

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APPENDIX A

INTERVIEW SCHEDULE

FOOD BUYING HABITS AND PREPARATION TECHNIQUES*

Panama City, Panama

I. SELECTION OF THE PERSON

Are you a housewife? Yes _____ No _____

Do you live in Panama City? Yes _____ No _____

How many members make up your family? 2 or less _____ More than 2 _____

Does your husband live with you? Yes _____ No _____

II. BACKGROUND INFORMATION

Have you always lived in Panama City? . . . . . Yes _____ No _____

How long have you been living in Panama City? . . . . . Less than 1 year _____ 1-5 years _____ 6-10 years _____ 11-15 years _____ Over 16 years _____

Where were you living before you came to live in Panama City? . . . . . Rural _____ Urban _____

Could you name two food items that you have included in your diet since you came to live in Panama City? . . . . . _____ _____

Could you name two food items that you have excluded from your diet since you came to live in Panama City? . . . . . _____ _____

Have you attended school? . . . . . Yes _____ No _____

How many years of school have you completed? . . . . . 1 - 3 _____ 4 - 6 _____ 7 - 9 _____ 10 - 12 _____ Over 12 _____

Has your husband attended school? . . . . . Yes _____ No _____

How many years of school has he completed? . . . . . 1 - 3 _____ 4 - 6 _____ 7 - 9 _____ 10 - 12 _____ Over 12 _____

How many of your family members are in each age group? . . . . . Under 1 year _____ 1 - 5 years _____ 6 - 11 years _____ 12 - 17 years _____ Over 18 years _____

In which age category are you: . . . . . Under 18 years _____ 18 - 29 years _____ 30 - 39 years _____ 40 - 49 years _____ Over 50 years _____

III. FOOD BUYING HABITS

Would you please tell me if you used the following products during the preceding week. If you used them, how did you obtain them. If you bought them, how many times per week did you buy the product and what amounts did you get.

Product	Get it How				Frequency				Amount Bought	How is Used		Comment
	Not used	Buy it	Garden	Otherwise obtained	Every day	3 times/wk	2 times/wk	1 time/wk		Raw	Cooked	
ANIMAL PRODUCTS												
Milk Fresh												
Evaporated												
Powdered												
Cheese												
Liver												
Other organ meat												
Meat												
Dry codfish												
Incaparina												
VEGETABLES												
Dk. green leafy												
Carrots Fresh												
Canned												
Pumpkin												
Plantain Ripe												
Green												
Sweet potato												
Tomato												
FRUITS												
Maney												
Pijibaye												
Ripe mango												
Avocado												
Papaya												
Cantaloupe												
Breadfruit												
Monbin												
GRAINS												
Beans												
Lentils												
Pigeon peas												
Chick peas												
Split peas												
Green peas												
Lima beans												
Cream of cereal												
Oatmeal												
Bread												
Yam												

IV. PREPARATION TECHNIQUES

Who usually prepares meals in your family?

Herself _____
Husband _____
Daughter _____ (____ years)
Son _____ (____ years)
Mother _____
Father _____
Mother-in-law _____
Father-in-law _____

How are vegetables usually prepared in your house?

Raw _____
Fried _____
Boiled _____
Baked _____
Roasted _____

How do you boil the vegetables?

Peeled _____
Unpeeled _____
Whole _____
Cut _____
Use a lot of water _____
Use little water _____
Use them alone _____
In other dishes _____

What do you usually do with the liquid in which you boiled vegetables?

Add it to the soup _____
Add it to the rice _____
Add it to the meat _____
Add it to the beans _____
Throw it away _____

What do you usually do with the liquid of canned vegetables?

Add it to the soup _____
Add it to the rice _____
Add it to the meat _____
Add it to the beans _____
Throw it away _____

Do you rinse the meat before cooking it? Yes _____ No _____

How do you rinse it? Under the faucet _____
Use a pan _____

How many times do you rinse it? 1 _____ 2 _____ 3 _____

Do you cook in iron pans? Yes _____ No _____

Assuming you had an additional $20 to spend monthly, would you spend more money on food? Yes _____ No _____

If you spent all or part of that money for food, what kind of food would you buy?

Milk or cheese _____
More quantity same cut of meat _____
Better quality meat _____
Vegetables _____
Fruits _____
Breads and cereals _____
Beans or lentils _____
Sweets _____
Beverages _____
Other _____

*Copies in Spanish are available from the author:

P. O. Box 1486
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APPENDIX B

COMPARISON OF THE NUTRITIVE VALUE OF ONE GLASS OF "INCAPARINA" WITH MILK*

	Atole of Incaparina** 1 Glass	Milk 1 Glass
Calories	138	141
Protein, g	6.9	6.9
Fat, g	1.0	7.6
Carbohydrates	25.3	11.3
Calcium, mg	164	374
Phosphorus, mg	174	168
Iron, mg	2.1	1.0
Vitamin A, I.U.	1,125	363
Thiamin, mg	0.58	0.08
Riboflavin	0.28	0.50
Niacin, mg	1.95	0.10

*Taken from INCAP, 1965.

**One glass of atole is prepared by dissolving 25 grams of Incaparina in one glass of water, boiling the mixture for 10 to 15 minutes and sweetening it with 12 grams of sugar.

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